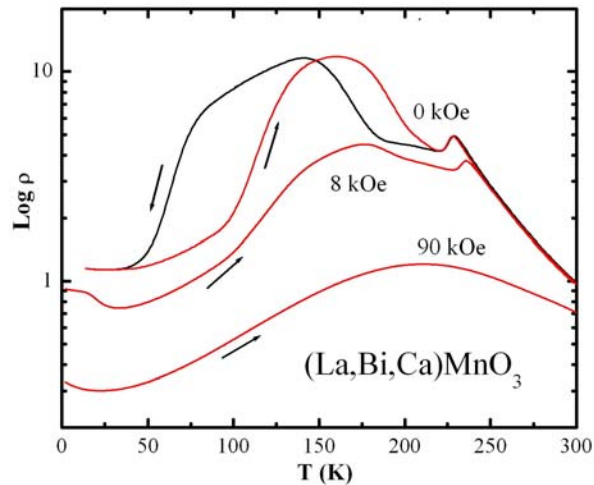
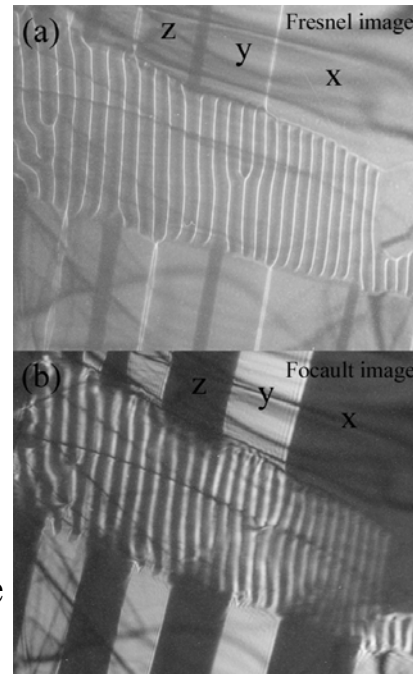


# Measurements with a newly-installed Quantum Design PPMS



(Magneto-)transport data on a manganite from PPMS measurements. Two transitions appear to be correlated with the two types of ferromagnetic domains.



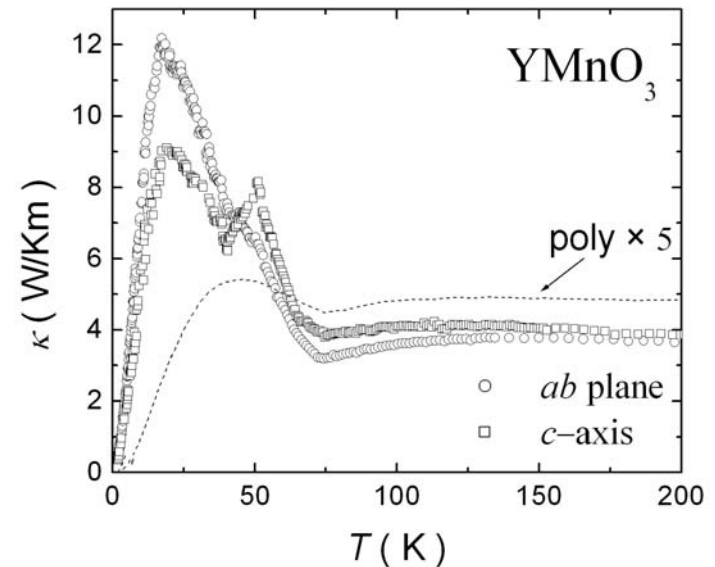
Lorenz Transmission Electron Microscope images with Fresnel (a) and Foucault (b) modes. Regular, micron-size Ferromagnetic domains coexist with 100 nanometer-scale stripe FM domains.

**A Quantum Design Physical Properties Measurement System with  $\text{He}^3$  option was successfully installed, and the first experiment by using the PPMS was performed on Jan. 8, 2003. Ever since the installation, the PPMS has been kept continuously cold, and heavily utilized for our research on functional complex materials. One example is the mesoscopic organization of ferromagnetic domains in mixed-valent manganites. Our transport and magnetic results from the PPMS experiments, combined Lorenz microscopy data by S. Mori at Osaka Prefecture University, Japan, reveal unprecedented FM domain structures and their strong coupling with transport/magnetic properties.**

# Utilization of the PPMS for education as well as inter-institutional collaboration.



Upper: Derya Yinanc, an undergraduate student in the honor's program, is operating the PPMS for thermal conductivity ( $\kappa$ ) experiments. Right:  $\kappa$  data by Yinanc on hexagonal  $\text{YMnO}_3$  are shown.



- **PPMS has been utilized for the undergraduate honor's program at Rutgers as well as the Partners in Science program (sponsored by Liberty Science Center, New Jersey for high school students) to teach the basic measurement techniques such as experiments on electronic conductivity or thermal conductivity. PPMS is also planned to be used for the summer program for the underrepresented high school students in Newark area.**
- **PPMS is also utilized for the collaborative research with New Jersey Institute of Technologies (NJIT: Trevor Tyson). Graduate and undergraduate students (Michael Deleon and Zhiqian Chen) from NJIT have joined the PPMS experiments at Rutgers.**